

Bioluminescent Mushrooms

On a jungle night hike, we paused and turned off our head-lamps. Suddenly we were confronted with glowing mysterious patches around the forest. They were logs sprouting some of the brightest bioluminescence we have ever seen. Participants are currently sequencing the genes of these mushrooms to determine if they are a new species.

THE DIGITAL NATURALIST'S

GUIDE TO GAMBOA

**Semi-Reliable,
Location and
Creature
Guide**



www.dinalab.net

By Digital Naturalism
Laboratories



Male Three-toed sloth perched atop a Cecropia tree full of Azteca ants deeper down pipeline road (Aerial photograph by A. Quitmeyer)

Most imagery created and collected by the Dinacon 2 Documentary crew (Ananda Gabo, Jorge Medina, José Alejandro Riascos Ramírez, and Nate Walsh), Andy Quitmeyer and the participants themselves.

Creatures
illustrated by Aziza Daksla, Ananda Gabo, Kitty Kelly, Andy Quitmeyer.
Translations by Jorge Medina

Booklet compiled and edited by
Andrew Quitmeyer



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It is only by working together that we can collectively form new ideas and methods for exploring and understanding our world.

2020 - Digital Naturalism Laboratories

www.dinalab.net



USEFUL PHONE NUMBERS AND LINKS:

Emergency Phone Number: 911
STRI emergency/ anything: 212-8911

STRI Emergency Protocol:
<https://tinyurl.com/GamboaEmergency>

Gamboa police: 314-9439,
(policia ecologica): 314-9451
Firefighters + Ambulance: 103
Police: 104

General public issues (sewer overflowing, street maintenance):
311

Gamboa Tips and Tricks Document: tinyurl.com/GamboaTips
Gamboa Carpool: tinyurl.com/GamboaCarpool
Dinalab Equipment Checkout: <https://tinyurl.com/dinalabEquipment>

USEFUL CONTACTS

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DINACON chat group (general):
<https://tinyurl.com/dinaconRIOT>
DINACON chat (logistics):
<https://tinyurl.com/dinaconRIOTotg>

WHERE TO GO

DINALAB: 123B Sibert, GAMBOA, PANAMA
From the Airport
- get taxi to GAMBOA
- Left after the bridge
- First right up to gamboa, up the hill with palm trees
- DINALAB is second house on right

A NEXUS OF STRANGENESS

Welcome!

We are delighted you could join us in this very odd place. Not many towns on earth are between a massive shipping canal and incredible natural biodiversity. Most don't have a captured Nazi crane overlooking a biological field station buzzing with international scientists. And many towns don't have agoutis trotting down streets, howler monkeys echoing in the distance, rivers of green leafcutter ant highways, and creepy Yogi Bear heads on springs. (Plus, Gamboa probably has the best street signs in the world).

Gamboa, Panama sits at the confluence of 2 continents, 2 oceans, and evolving ecological, technological, and sociological factors over the past 100 years. It's located directly in the center of Panama wedged between the canal and the Soberania National Forest.

This spot of extreme biodiversity and massive anthropogenic geoengineering became the home of the Smithsonian's Tropical Research Institute (STRI), one of the world's leading outdoor laboratories. The location provides direct access to a wide variety of fascinating jungle creatures. You will see leaf-cutter ants blazing green, shimmering trails through the forest while howler monkeys roar in the dis-

tance. Agoutis and capybaras lope around the small town, which also hosts caimans, iguanas, and several hundred bird species. Plus, Gamboa is only 40 km from the nearest international airport hub, making it quite easily accessible from many places on earth.

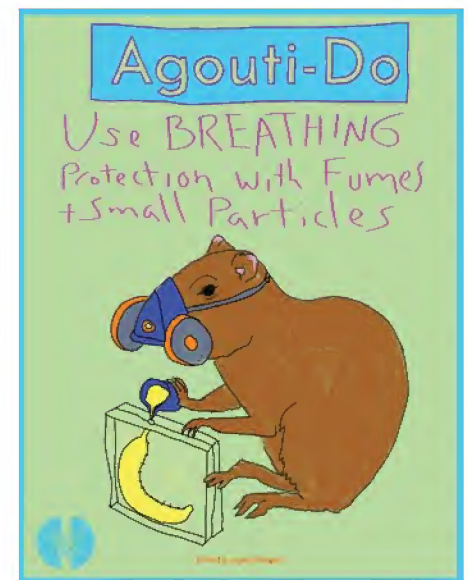
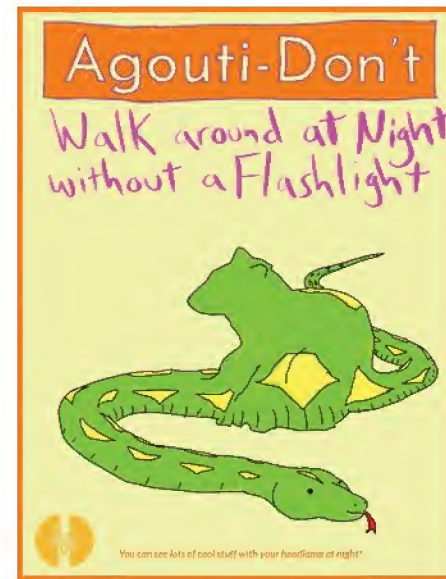
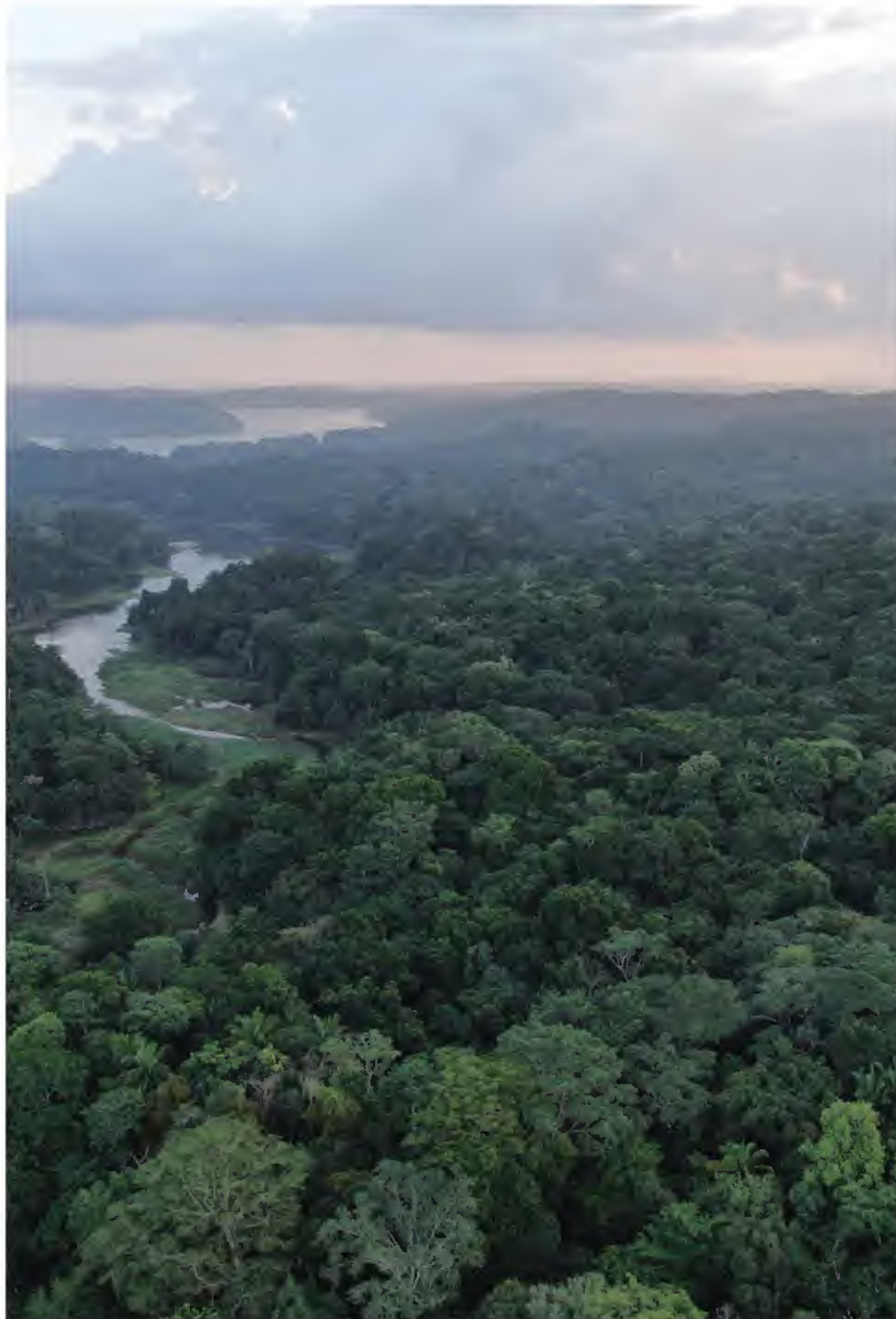
It looks and feels like a small, midwestern US town from the mid-20th century (it even has a baseball field!) that has been taken back over by the jungle a fair amount.

We hope you enjoy your time in this special place, and learn to love and interact with the creatures surrounding you.

This packet includes a basic guide to many of the non-human creatures you will meet during your stay. It is very simple, a bit prone-to-error, and sometimes downright wrong.

You really shouldn't just straight-up believe any information just handed to you though, so we encourage you to question and verify information by exploring it yourself, first-hand.





DINALAB SAFETY POSTERS

Take your time, Be Careful, Respect Others, Help Others



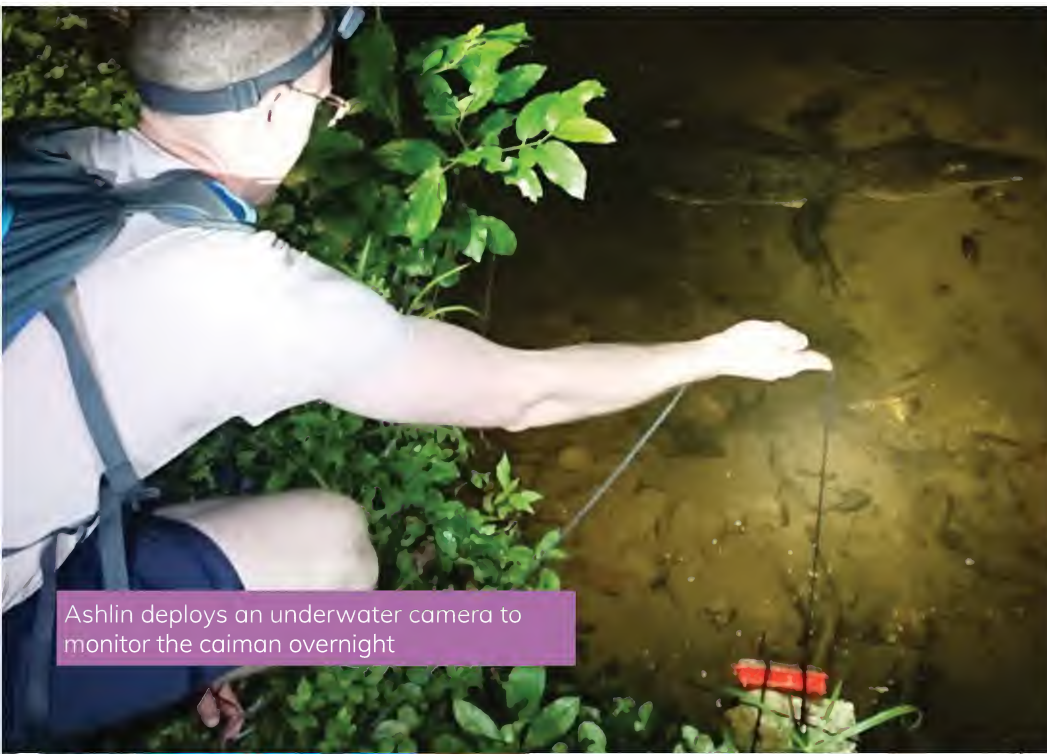


(Above) Scientist Hannah Marti brings a group on a tour of her Leaf Cutter experiments

(Below) Emily Volk takes her water color painting to the source and uses the water itself to depict the jungle waterfall



Marta Verde 3D prints her own cast for a hand injured in the jungle.



Ashlin deploys an underwater camera to monitor the caiman overnight

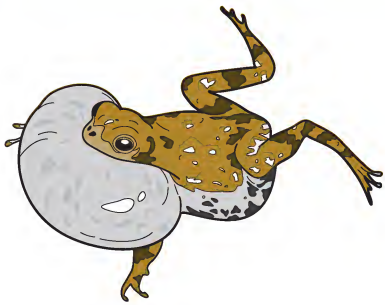


Jonas Kramer leads a welding workshop at Dinalab.



Sights around Gamboa.
Photography by Nate Walsh.
Murals by Damond Kylo

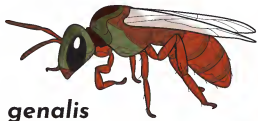
SCIENTIFICALLY FAMOUS CREATURES



Engystomops pustulosus

Túngara Frog / Sapo Túngara

Subject of one of the longest animal behavioral studies, these frogs sound like laser-videogames with a 2-part mating call, the whine and the chuck (the more chuck, the sexier the call). You will find them in puddles and sewers with big piles of foam (their egg clutches).



Megalopta genalis

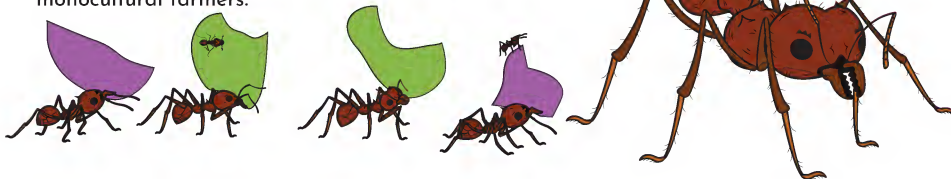
Nocturnal Sweat Bee / Abeja del sudor Nocturna

These bees are sometimes solitary and sometimes social. They forage for food only during sunset and sunrise (they are crepuscular), and need special eyes to navigate at high speeds in dim light.

Atta columbica

Leafcutter Ant / Hormigas Arrieras

The most obvious animal in the forest. The rivers of leaves flowing through the jungle are carried by one of the most sophisticated superorganismal systems of ants delivering vegetable matter to grow large fungus farms. Each fungus is genetically specific to one specific colony, and they are perhaps the world's most successful monocultural farmers.



Trachop cirrhossis

Frog Eating Bat / Murciélago de Labio Verugoso

This bat listens to the calls of the Tungara frogs, and chomps them down good. They are super clever, and can learn and remember artificial calls (like cell phone ring tones) for years!

Heliconius melpomene or *Heliconius erato*

Mariposa de bandas Carmesí

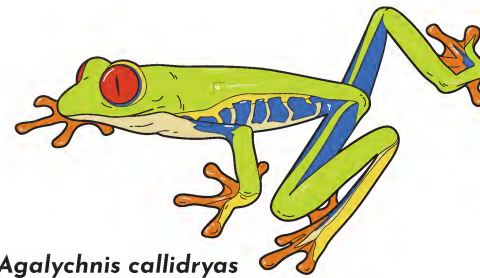
This genus of jungle butterflies has large variation in color patterning. Different species often mimic each other to share warning signals against predation (mullerian mimicry).



A rogue plant-controlled DRONEBORG takes off to the skies. Does it indicate future harmony for both flesh and metal, or does it spell annihilation? (Part of David Bowen's drone projects)



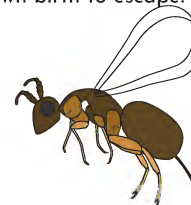
Contextual Crafting: Michal Sahaf casts silicone forms in nature while Craig Durkin explores the area with a mountain bike.



Agalychnis callidryas

Red-Eyed Tree Frog / Rana Arborícola de Ojos Rojos

This is the go-to creature for designers when they want to let an audience know that something is really in the rainforest. They are lovely, colorful creatures with a neat superpower: Their eggs can sense vibrations around them, and if predators are detected, they can induce their own birth to escape.



Chalcidoidea

Fig Wasps / Avispa del Higo

Fig flowers are on the inside of the fruit. How does that work? Ask someone about the wasps!



Cebinae

Capuchin Monkeys / Monos Cariblanco ó Monos Capuchinos

Rambunctious monkeys with incredible prehensile tails.

Thamnophilidae

Ant Birds Aves Hormigueras

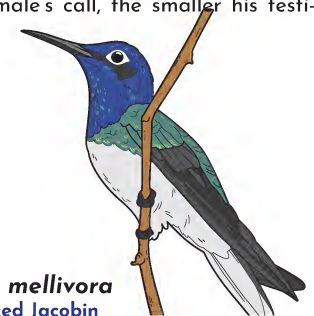
Cute birds with a neat symbiosis with Army Ants. They follow swarms of ants moving through the forest and opportunistically munch insects flushed out. Ant-scientists form a mutualism with these birds to listen for their calls, to hunt down where Army ants are living.



Alouatta

Howler Monkeys / Monos Aulladores

That terrifying dragon roar you hear in the jungle? Just dude monkeys yelling at each other. Supposedly, researchers found the louder a male's call, the smaller his testicles are.



Florisuga mellivora

White Necked Jacobin

/ Jacobino Nuquiblanco

Hummingbirds in general are a violent, blood- and sugar-thirsty set of creatures whose hover battles sound like light-saber fights. These Jacobins have an interesting sexual morphism where some females have entirely male coloration. Scientists are trying to figure out why.

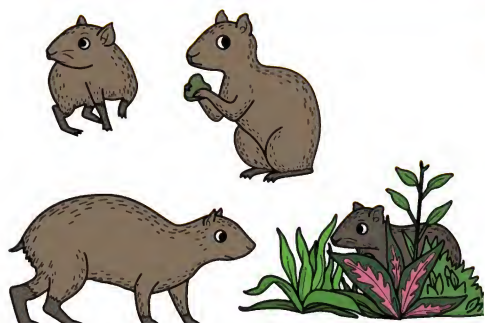
Eciton burchelli

Army Ant / Hormigas Gurreras

Unlike other ants, Army ants have no static home. Instead, they roam the forest, like a giant particulate amoeba, flowing through the jungle and consuming all in their path.



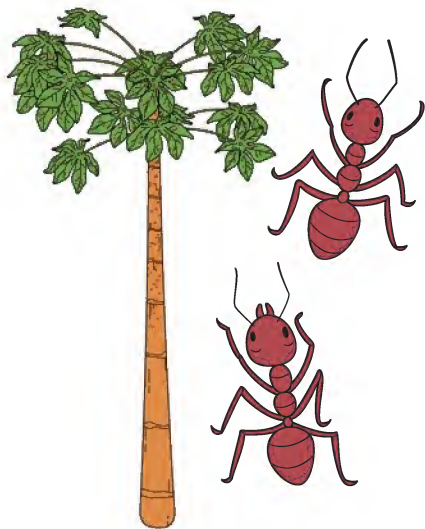
CHARISMATIC AND COMMON FRIENDS



Dasyprocta leporina

Golden Rumped Agouti / Yard Pig / Wonderpig / Ñeque

A ubiquitous creature in Gamboa. It is both the silliest and most gracefully athletic creatures. Females are larger than males and live 15-20 years in captivity. Related to porcupines, its hair on its butt poofs up when it is startled (which is often), and it scampers away with a loud huff-squawk.



***Azteca alfari* + *Cecropia* Trees**

Aztec Warrior Ants / Hormigas aztecas + Guarumo

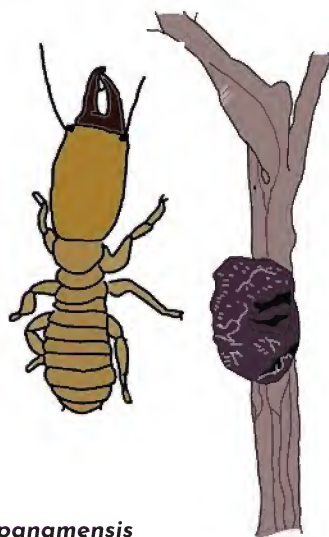
These ants have a symbiotic mutualism with a tree. The bamboo like stalk provides a home for the ants, while the ants act like an active forcefield against herbivores.



Morpho didius

Blue Morpho Butterfly / Mariposa Morfo Azul

Often mistaken for an actual butterfly, these are not even insects, nor animals at all. Instead these crystal blue apparitions flashing across the jungle green are actually small tears in the fabric of space-time. These 0-dimensional irregularities bend the ambient light passing by to reveal brilliant blue flashes.



Termes panamensis

Termites / Termitas

Those cool gnarly knobs you have been seeing around the jungle? Full of termites! Check out their covered pathways spreading like veins across a tree. What are they doing in there?

THINGS TO DO

Did you finish your project? Somehow struggling for something to do despite being surrounded by fascinating people, wildlife, and technology? Probably not, but it can be overwhelming! Also you have a unique chance to contribute projects that last by building them into Dinalab's infrastructure. Here's tips of fun and useful things to do:

- Go on a night hike or even nighttime stroll around town (bring headlamps)
- Fix something broken
- Have a picnic near the canal
- Borrow a kayak and take it on the Chagres
- Help somebody document their work
- Build some permanent infrastructure for the Dinalab (perhaps an automated, hydroponic garden? or a portable outdoor workshop?)
- Take an existing project and make it wireless/waterproof/hackable/interconnectible/launchable/wearable/sonified/visualized
- Draw a neat creature
- Relax and enjoy the sounds of the forest
- Meditate
- Teach a workshop
- Stare at an animal for a really long time
- Ask a scientist about something they need help with
- Design a real or theoretical tool for Dinalab





Terrestrial Exploration

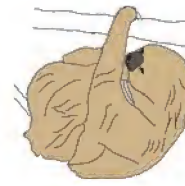
Pipeline road (oleoducto) is one of the biggest birding sites in the world and a key scientific research path in the Soberania national forest. And it's right in Gamboa!

The jungle also has various levels of accessibility. You can just stay on Pipeline road, which is a road that cuts through the jungle, or you can walk down a path along a river deeper into the jungle, or you can go bonkers and bushwack through super rough stuff.



Aquatic Exploration

We can rent kayaks and go in the lake nearby! You can also hire boats and ride around the canal and visit islands! If we are lucky, we can work out some trips to Barro Colorado Island (BCI).



Choloepus didactylus

Two-Toed Sloth / Perezoso de dos garras

These gentle friends are often overlooked as barely moving balls of fluff in the canopy. Their slow metabolism means their food can take 1 month to digest, but sometimes you can spot them when they come to the ground to poop.

Paraponera clavata Bullet Ant / Hormiga Bala

Tied for the largest ant in the world, it has undoubtedly the most painful sting of any wasp, ant, or bee. It scores a whopping 4+ on the Schmidt Pain Index. (Shown actual size.)



Choloepus didactylus

Three-Toed Sloth / Perezoso de tres garras

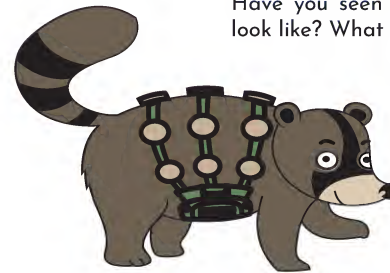
Bigger, and more toes than the 2 toed.



Aotus

Night Monkeys / Mono Nocturno

Have you seen one? What do they look like? What are their secrets?



Nasua narica

Coatimundi / Gato Solo

An adorable pointy jungle panda, these racoon relatives have a long flexible snout that can rotate 60 degrees in any direction. Adult males roam as individuals, but females and juveniles roam in packs, and use their long tails held up high to stay together in thick vegetation. Depicted here is a futuristic coati with experimental laboratory backpack workstation.

Caimaninae

Caiman / Caimán

They are the tiny crocodile looking things seen in ponds, or sometimes just strolling up the street. Their eyes have a distinctive color shine you can easily spot at night.



Ramphastos sulfuratus

Keel Billed Toucan / Tucan Pico Iris

One of the two species of toucan in gamboa, these are hilarious jerks of birds. They pretty much eat whatever can go into their large gorgeous beaks and have been spotted munching down others' baby birds

Tamandua mexicana Northern Anteater / Tamandua Norteño

Nearly blind, long tongue, walk funny, can gut you with their claws.

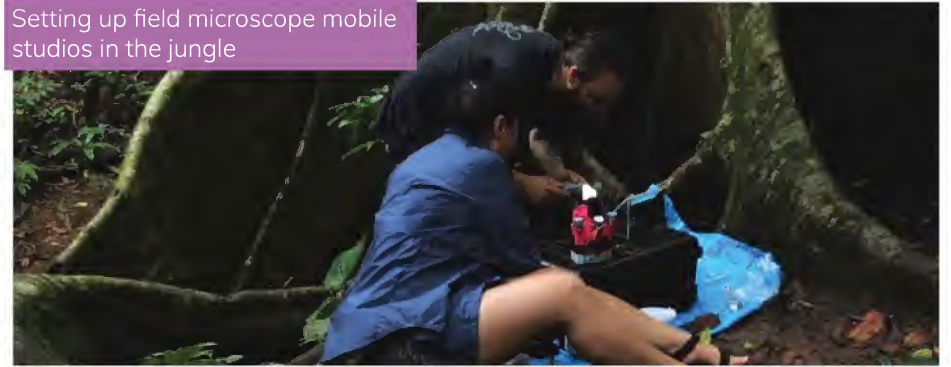


DINALAB

GAMBOA, PANAMA
Founded 2019



Setting up field microscope mobile studios in the jungle

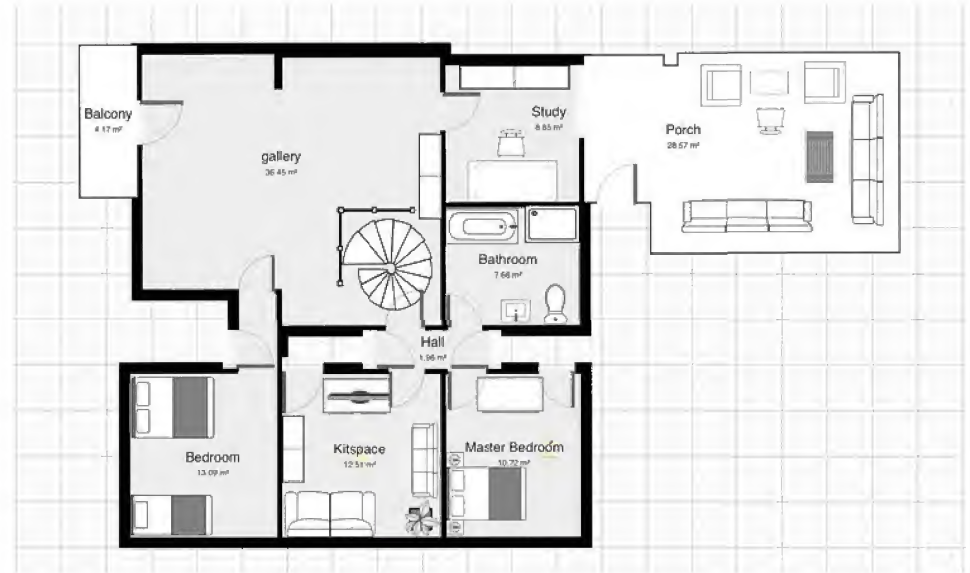




Scenes from Dinalab's open day in the Gallery.



Guest Residency Room



The goal of our laboratory is to **explore new ways of interacting with the non-human, living world**. We welcome you to take on this challenge in any way you see fit, and we try to provide you with as many tools as possible. Our philosophy is one of freedom, responsibility, and respect, so we try to provide as few rules or guidelines as possible and rely on you to help make all of Gamboa a fun, creative, safe, welcoming atmosphere.



Digital Naturalism Laboratories (Dinalab) facility! It's a 100% solar powered, fully stocked workshop for arts, engineering, design, scientific tool-making, and small scale manufacturing.

Kitty and Andy just started setting it up in February 2019, and it will only get more and more awesome!

This is a 235 square meter building located right in Gamboa, Panama. There's a jungly backyard complete with agouti research assistants.

There is housing for 6 people, a large kitchen, 3 refrigerators, and two bathrooms. There is fiber optic internet (75MBps), which is an amazing luxury in this remote town, along with electricity, gas, and drinkable tap water.

There is an electronics workshop on the first floor that currently has:

- Laser Cutter
- 2x 3D printers
- Vinyl Cutter
- Soldering Stations
- Power Tools
- Robotic Arms

hundreds of assorted electronics, sensors, and microcontrollers and much more!

The lower level also features a garage workshop with larger wood and metal working tools. Next to the garage shop is a utility room with industrial sinks and washer and dryer.

The upper floor has bedrooms for visiting residents and a large gallery space / modular workshop area. There is also a lovely screened-in back porch for birdwatching, dining, yoga/working out, or movie showings.

We have one jungle truck available for accessing nearby features, and moving large objects or groups of people. It's a Ford Ranger, 4x4 Turbo. With local architect Andrew Coates, we have also set up a volunteer rescue service that frees scientists stuck behind fallen trees.

Dinalab is used to host long-and short-term bioart, design, and engineering residencies, as well as function as a community makerspace.

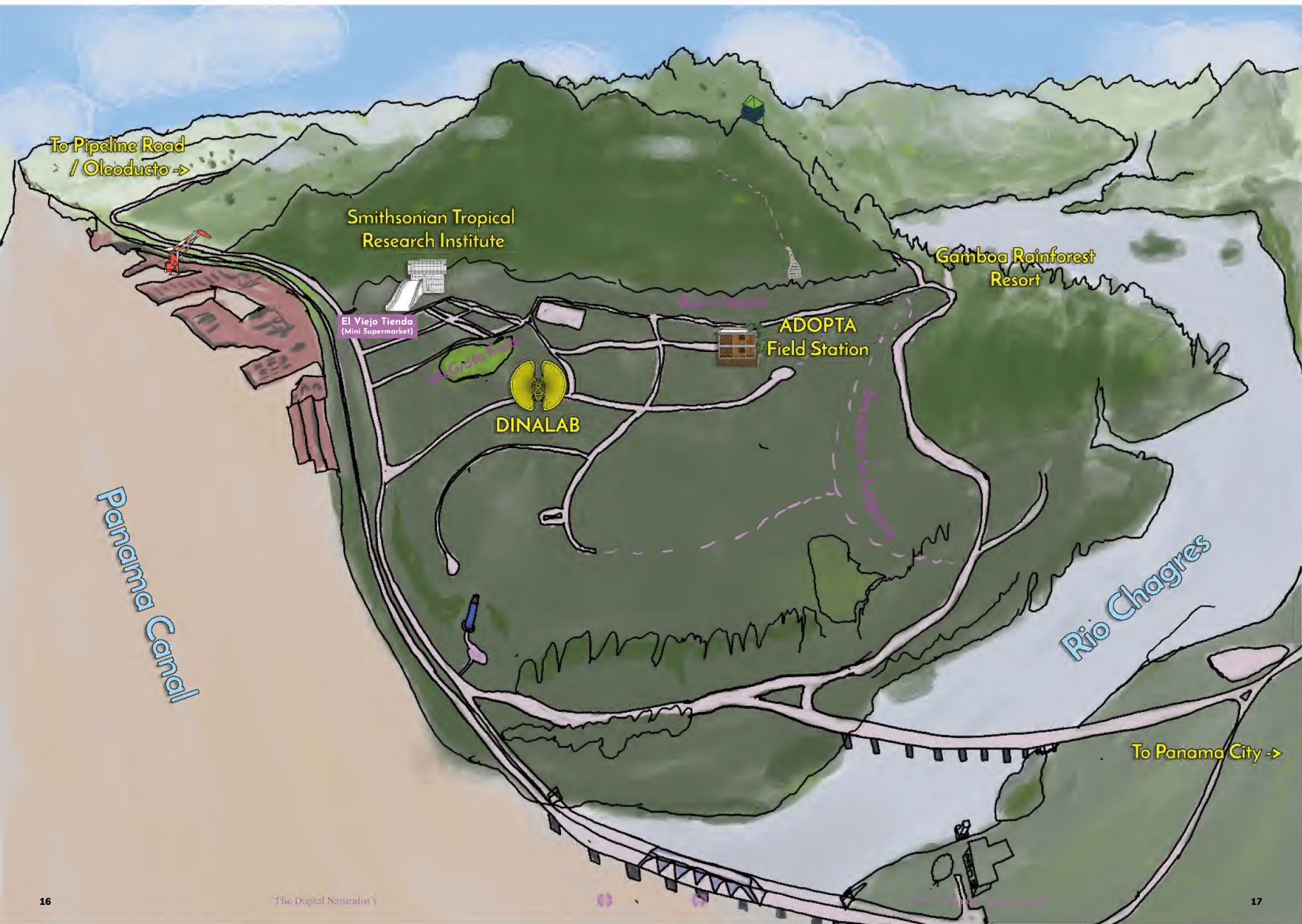
Dinalab's kitchen is very popular.





Workshop with Powertools and laser cutter





To Pipeline Road
> / Oleoducto ->

Smithsonian Tropical
Research Institute

El Viejo Tienda
(Mini Supermarket)

DINALAB

ADOPTA
Field Station

Gamboa Rainforest
Resort

Panama Canal

Rio Chagres

To Panama City ->